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NEWSLETTER OF THE AUSTRALIAN NETWORK FOR PLANT CONSERVATION

New Rare or Threatened Australian Plants Listing

John Briggs, NSW National Parks and Wildlife Service

After an unexpectedly long gestation period with the publisher, the long-awaited 1995 version of *Rare or Threatened Australian Plants* is finally published. Many readers may be already using or have seen information (usually referred to as"Briggs and Leigh, in press") contained in this publication. This is the fourth edition, now commonly referred to by its acronym 'ROTAP'.

The ROTAP list and its associated coding system was developed and has been maintained by CSIRO since 1979. The first version, called *Plants at Risk in Australia*, was published in 1979, with subsequent expansion and revisions published in 1981 and 1988.

ROTAP has the purpose of providing an assessment of the conservation status of Australia's flora from a national perspective. Although it is a specialised reference publication, it is of interest to and widely used by a broad spectrum of the community who have an interest in conservation matters. Users include State and Commonwealth conservation agencies, professional and amateur botanists and naturalists, conservation groups, environmental consultants and local government planners. Apart from a few examples illustrating applications of the conservation coding system, detailed case studies and colour photographs are not included. It is not therefore recommended bedtime reading unless you wish for immediate sleep! Other publications are available which provide text and illustrations of examples of threatened flora.

The current ROTAP list has expanded from 3 329 taxa in 1988 to now include 5 031 taxa. Assuming an estimate of 22 000 native plant species for Australia, then the number of listed Rare or Threatened flora represents a significant proportion (22.9%) of the total known Australian flora. Of those listed, 4 015 are formally described and 1 016 (884 species

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National Coordinator's Report

Jeanette Mill

A recent review of the federal Environment portfolio has lead to widespread changes in the structure of the department and its agencies. Therefore you will hear names such as Environment Australia, Biodiversity Group and Threatened Species and Communities Section where you used to hear Department of the Environment, Australian Nature Conservation Agency and Endangered Species Unit. We hope to bring you an overview of the changes in a future edition of Danthonia.

Much time of late has been spent on the ANPC's submission for funding to the then Endangered Species Unit of the then Australian Nature Conservation Agency. Despite a climate of cuts, the Network was able to secure sufficient funds to maintain our current staff and projects until mid 1997, but not to permit growth. The Australian National Botanic Gardens continues to play a major role in supporting the ANPC. Member subscriptions are also important, and 1997 memberships are now due.

The new edition of *Rare or Threatened Australian Plants*, by Briggs and Leigh, was recently released. The lead article in this newsletter has been provided by John Briggs to bring you up to date on this important publication. Senator the Hon. Robert Hill, Federal Environment Minister, launched the book at the Centre for Plant Biodiversity Research in Canberra on December 3. The ANPC had a display at the launch - we never let a chance go by.

Finally, I would like to wish you all a very happy festive season. In the tradition of my forebears, I offer a sprig of the still endangered *Grevillea wilkinsonii* as an illustration of what we are continuing to work towards. Thanks for your support in '96 and see you at the conference - June 23 - 27 1997, Coffs Harbour. Be there!

Illustration: Faye Davies

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and 157 subspecies and varieties) await publication of a formal name and description. Of the undescribed taxa, 356 species and 68 subspecies and varieties are listed under their manuscript names, with the remainder listed under a phrase name.

For those readers keen to know the bottom line, here it is. Seventy-six taxa (1.5% of taxa listed) are Presumed Extinct, 301 (6%) are Endangered and another 708 (14.1%) are Vulnerable. In all, 1 009 taxa (20.1%), or about 4.6% of the estimated Australian flora, are known to be threatened. A total of 1 570 species (31.2% of all listed) are Rare plants in Australia which are not believed to be under any foreseeable threat. A further 2 376 taxa (47.2% of all listed) are believed possibly Rare or even Threatened (coded K), with 1 365 of these occurring in the South-Western Province of Western Australia.

The ROTAP list has no legal status but is an important reference for the national status of threatened species, particularly for Rare and Poorly Known species which are not recognised under the Australian and New Zealand Environment and Conservation Council (ANZECC) or the Commonwealth's Endangered Species Protection Act lists. The 1996 edition also includes a significant number of Endangered and Vulnerable taxa which have not yet been considered for inclusion on either the ANZECC or the Commonwealth's Schedule 1 lists. In due course the cases for these taxa to be included on these lists will be prepared, submitted and examined by the relevant advisory bodies. Therefore, in practice, this edition of ROTAP provides the most up-to-date list for conservation purposes because of the lag phase associated with the other lists.

A similar suite of information to that presented in the 1988 edition is provided, including the national Conservation Status coding, the state and regional distribution and extent of reservation for each species and the names of formal conservation reserves in which each species has been recorded. Essentially the same Conservation Status definitions used in 1988 have been retained.

The list has again been presented in two forms. One is a full national listing with species arranged in alphabetical order by family, then genus and species. Individual state lists are also included, with species arranged alphabetically by genus and species. A broad range of national and state summary statistics are presented, including a series of colour maps showing the pattern of distribution of numbers of species in each of the five Conservation Categories within 80 biogeographical regions across Australia.

Significant changes to the content of the 1996 list compared to that of the 1988 list are:

- the inclusion of subspecies and varieties (their inclusion recognises the need to pay conservation attention to some plant populations which may be genetically and ecologically significant but which are not currently considered to be taxonomically distinct at species level);
- the inclusion of a separate Australian Capital Territory list and distribution symbol in the national and state listings;
- the inclusion of several updated Australian island territory listings (Lord Howe, Macquarie, Norfolk, Philip and Christmas Islands);
- a discontinuation of the use of dual codings for Western Australian taxa (most WA taxa previously flagged with the symbol 'k', but coded as 'E', 'V' or 'R', have now been relisted as Poorly Known in accordance with the wishes of the WA Department of Conservation and Land Management (CALM));
- the inclusion of CALM Priority Flora codes for WA taxa;
- the inclusion of the names of reserves containing WA taxa where such information was available to the authors.

Publication of ROTAP (1995) marks the end of an era, in that CSIRO is handing the future maintenance of ROTAP to the Endangered Species Unit of Environment Australia, as both the current authors have now left CSIRO. John Leigh has retired to a rural property near Cowra, NSW, and I have taken up a position with the NSW NPWS Southern Zone Office at Queanbeyan, NSW.

The list is available on http://www.publish.csiro.au

The book sells for $44.95 from CSIRO Publishing, PO Box 1139, Collingwood Vic 3002. Phone: 03 9662 7500.

Setting the Scene for Threatened Plants in the Northern Territory

Prue Adamson, NT Coordinator, Threatened Species Network

For the last four years the Threatened Species Network NT (TSN NT) has been working closely with the local Society for Growing Australian Plants (SGAP) group and Parks and Wildlife botanists to increase the profile and protection of threatened and endangered plants in the arid region of the NT.

A bit of background

Arid plants have, I feel, a bit of an image problem for many people in central Australia. The country is harsh with lots of unwelcoming prickly bits which often make walking uncomfortable. Recreation is often limited to waterholes and creek beds where the ancient and stately River Red Gums are the most noted regular companions to a camping trip. To venture out and explore the rest of the bush takes dedication and interest. For those of us who do and who know a bit about this part of the world, arid plants offer a rich and interesting variety with constant examples of amazing adaptation to hostile and unpredictable environmental conditions.

Unfortunately, as with most mammals in central Australia, the impact on plants from non-aboriginal settlement has been devastating. Most changes to plant communities have resulted from a major alteration to a management 'tool' used by the Aboriginal people for thousands of years prior to this settlement. Briefly, it is thought that fires were regular, patchy, cool and both designed to secure fire-sensitive vegetation communities and provide lush feed for animals which were hunted. Once this pattern changed across the huge expanse of country covered by arid Australia, plant communities changed too. Today we have a situation where spinifex has extensively blanketed much of the country, posing a threat to other plants as it burns 'hot', which results in the killing of many fire-sensitive plants. Once a fire starts in this spinifex it is hard to stop, and extensive areas have been burnt over the last decade or two.

Other threats involve sensitive areas being grazed and trampled by feral animals and stock. This particularly occurs around waterholes and gorges and in areas known as refuge sites where in dry times plants and animals could survive on the moist and fertile pockets of floodplains.

Threatened Species Network

Working together gathering information

Knowledge about the threatened plants in central Australia has largely been collected around road verges and in areas easily accessible or close to Alice Springs and other remote communities. This country is vast and largely unpopulated. There is limited opportunity to revisit areas which require sampling each weekend and for a large part of the year it is too hot to venture out and conduct surveys. Groups such as SGAP, TSN NT, the Central Land Council land management group, Tangentyere Council's Landcare officer and botanists have worked together gathering information and species lists for the region and are still finding new species to add to a growing list.

Based on what is known today there are fourteen arid based plants listed as vulnerable under the *Endangered Species Protection Act 1992*. Other species are being considered for listing. Through grants from the National Estate Grants Program (NEGP) and Save The Bush (STB), individuals and community groups such as TSN NT, the Arid Lands Environment Centre and Greening Australia are conducting and assisting with this research. Much more could be done and it is a commitment of the TSN NT to encourage graduate researchers to conduct some of the work needed to fill the gaps.

What TSN NT is doing to help

The TSN has worked hard to raise the profile of threatened arid plants and assist in researching little known plant communities. Work carried out so far includes the following:

- producing a series of six threatened plant species leaflets for public distribution and school use;
- receiving grants for research into two little known and probably threatened plant communities containing *Ptilotus aristatus* and *Eremophila prostrata* Chinnock ms;
- raising funds for and contracting out production of a display panel about threatened species at the Olive Pink Botanic Gardens;
- conducting two field days for community groups and individuals on plant survey techniques (based on *Eremophila prostrata* Chinnock ms;
- assisting with managing the nationally listed *Acacia undoolyana* community threatened by fire at N'Dhala Gorge and surrounding property, running a field trip of interested groups and individuals and formulating an interim recovery plan with input from Parks and Wildlife Commission staff;
- running an annual media campaign increasing the profile of threatened arid plants in central Australia;
- liaising with land managers and Landcare groups about protecting threatened plant communities and managing for fire; and
- working closely with other community groups such as the SGAP and Greening Australia in promoting the plight of threatened species and appropriate land management for all plant species.

Santalum acuminatum
Artwork by Christie Yon

The future for many of the threatened and unknown plants in central Australia is uncertain, with a long way to go to find out more about each species, developing management options and convincing land managers to consider them in their planning.

The TSN NT needs lots of help in these fields and encourages readers to contact us to find out more about what they can do.

Contact Prue Adamson, TSN NT, PO Box 2796, Alice Springs NT 0871.

Phone: 08 8952 1541;

Email: tsnnt@ozemail.com.au

Editor's note: TSN NT have produced several leaflets under the heading of 'Endangered Arid Zone Plants', covering such species as *Ipomea* sp. (Native Sweet Potato), *Acacia undoolyana* (the Undoolyana Wattle), *Ricinocarpus gloria-medii* (Glory-of-the-Centre Wedding Bush), *Enneapogon avenaceous* (Oat Grass) and *Santalum acuminatum* (the Quandong) .

Each leaflet describes the plant, its habitat (with a drawing of the type of habitat), the threats to it and how it can be protected, and lists how interested people can help and who to contact.

Seed Collection from the Rare *Acacia pickardii*

Clarry Smith, Curator,
Olive Pink Botanic Garden,
Alice Springs

During the past ten years, staff of the Olive Pink Botanic Garden and members of Alice Springs SGAP have been observing small and scattered populations of this rare Acacia to the south-east and more recently to the east of Alice Springs.

Late in 1995, members guided Marion and John Simmonds (authors of the book *Acacias of Australia*, volumes 1,2 and almost 3) to some of the more interesting Acacias of this area. On visiting a population of *Acacia pickardii* some 200kms east of Alice Springs many of the trees were found to be carrying a good crop of flower buds. The area was subjected to very heavy rainfall during January 1995 and it seemed that the budding probably resulted from this event.

It was resolved to carry out visits to the area at about four to six weekly intervals to observe flowering and fruiting should this eventuate.

Most of the trees were found in full flower in early November.

A further visit in January showed most of the flowers spent, but no seed set could be found. It was noted that almost without exception each peduncle was swollen and on closer examination each was found to contain a small grub.

Early in March it was found that the flowers had withered and fallen. After an extensive search for fruit, a single pod was found. The pod was still attached to the branch and a single seed could be seen in the partly open pod.

After a number of photographs were taken the twig, with pod and seed still in place, was cut from the tree and carefully delivered to the herbarium in Alice Springs.

Is this the first collection of seed from this species?

You can contact Clarry Smith at the Olive Pink Botanic Garden, GPO Box 8644, Alice Springs NT 0871.
Phone: 08 8952 2154;
Fax: 08 8953 5522

Editor's note: *Acacia pickardii* Tindale has a risk category of 3K in the most recent ROTAP list (see article page 1).

'3' means that its geographic range within Australia is greater than 100 kms.

'K' means Poorly Known. The taxon is suspected, but not definitely known, to belong to one of the other risk categories, and accurate field distribution information is inadequate.

Recent Important Publication

The Conservation of Plant Biodiversity. 1995. Otto H. Frankel, Anthony H. D. Brown and Jeremy J. Burdon. Cambridge University Press, Cambridge, UK.
ISBN 0 521 46731 4.

This book is the successor to *Conservation and Evolution* by O. H. Frankel and M. E. Soule published in 1981. That book helped to generate an understanding of and a concern for biological diversity as an essential condition for the continuing existence of life on earth. Since then, biodiversity has become a world issue. In much of the writing on biodiversity and its precarious state, a zoological bias is apparent. Unlike its predecessor, this book focuses on higher terrestrial plants, though animals take their place as foragers, pollinators and dispersal agents. It addresses conservation of plant genes, of plant species and of plant communities, including both domesticated and wild species.

The conservation of endangered species in situ and in botanic gardens ex situ is a particular focus of action, although the authors' emphasis is on longer-term, ecosystem oriented approaches as the most effective and enduring ones for the conservation of plant biodiversity.

Zieria prostrata Up For Review

The recovery process for an endangered plant

Patricia Hogbin,
Postgraduate student,
Australian National University

This attractive prostrate plant is known from only four headlands along a three kilometre stretch of coastline on the north coast of NSW near Coffs Harbour. *Zieria prostrata* grows in harsh wind-swept conditions in closed sod grasslands amongst *Themeda australis* and *Banksia integrifolia* close to rocky coastal cliffs. Z. *prostrata* is currently listed as 'endangered' in both the *Commonwealth Endangered Species Protection Act 1992* and the *NSW Threatened Species Conservation Act 1995.*

Z. *prostrata* was recognised as a species in 1992, but has yet to be formally named. Concern was expressed for this species due to its low population numbers and an apparent decline in population size. A recovery plan (Griffith 1992) was prepared under the then Australian Nature Conservation Agency (ANCA) Endangered Species Program and has been implemented over the last four years with advice from a recovery team. The recovery plan recognised extensive habitat degradation caused by uncontrolled vehicle access, pedestrians and weed invasion as the main threats to the survival of the species.

This year (1996), four years after the commencement of the initial recovery plan, the recovery team has begun the process of reviewing the existing program and preparing a new recovery plan. This provides the opportunity to evaluate the achievements of the existing plan and to re-evaluate the priorities for future research and management.

The main aims of the 1992 Recovery Plan were to:

- maintain and enhance existing population levels of Z. *prostrata* in the wild;
- undertake research upon which informed decisions about the management of the species and its habitat can be based;
- secure an appropriate level of environmental protection over Z. *prostrata* and its habitat; and
- ensure ongoing ex-situ propagation and cultivation of the species in botanic gardens.

Management outcomes

The recovery team has been successful in implementing habitat protection, allowing population regeneration. Fences and bollards have been erected to exclude vehicle access to the headlands which has led to a reduction in physical disturbance and soil erosion. An ongoing weed control program focuses in particular on weeds such as bitou bush, lantana and kikuyu. The task of weed control is enormous and much remains to be done, although immediate encroachment of weeds onto Z. *prostrata* populations has been arrested.

A translocation program was implemented at two of the four headlands in 1993 to increase population numbers and stability. The Look At Me Now Headland and Dammerels Head populations were enhanced with 260 and 140 individuals respectively. Of these re-introduced plants 19 are still surviving at Look At Me Now Headland and five at Dammerels Head.

Numbers of Z. *prostrata* within the four populations now appear to be stable. This can be attributed mainly to the effective habitat protection enabling regeneration. Numbers upon the most highly disturbed headland (Look At Me Now Headland) have increased (Steve Clemesha, pers. comm.) and a number of seedlings have been noted. The survival of these seedlings has been followed for the past seven months and no mortalities have yet been observed.

Another important achievement was the inclusion of the four headlands in the Moonee Beach Nature Reserve in late 1995. The reservation of the headlands was largely achieved as a result of submissions from the local Ulitarra Conservation Society and strong local support for the proposal. As a consequence of the reservation the responsibility for management of the headlands changed from the Coffs Harbour City Council to the NSW National Parks and Wildlife Service (NPWS). The latter are now in the planning process for establishing permanent walking tracks on two of the headlands to control pedestrian access and further reduce disturbance.

Research outcomes

Research into the ecology, reproductive biology and genetics of Z. *prostrata* is the basis of my PhD project which is funded by the NSW NPWS. By studying these aspects of

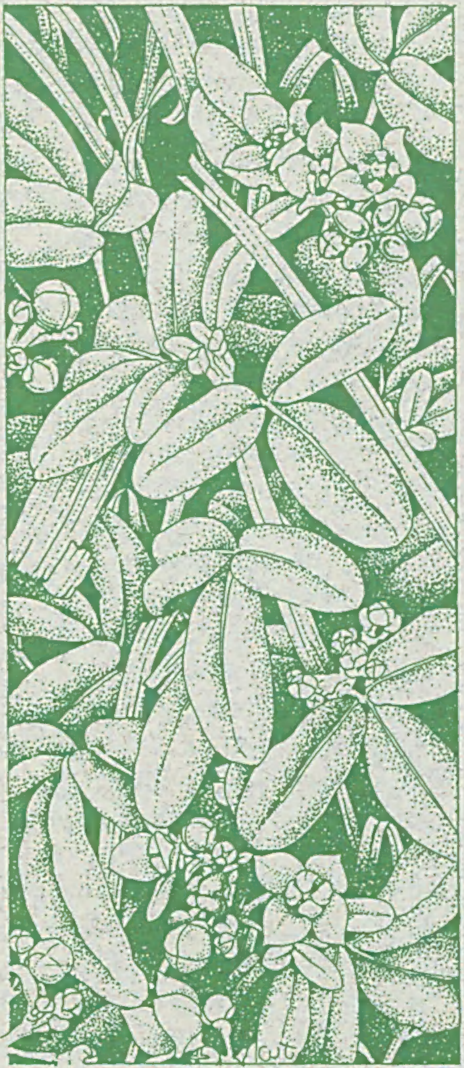
Z. prostrata I hope to be able to provide information to assist in evaluating the best active management options for the species.

Z. prostrata is covered in masses of small star shaped white to pink flowers from August through to October. It was previously thought that the flowers of the species failed to produce pollen (Jim Armstrong, unpublished draft on the Zieria genus). One of my first research priorities was to investigate whether this was indeed the case. Investigation of flowers during the 1996 flowering season has shown that individuals in all populations produced pollen, and tests of pollen viability in the laboratory revealed high pollen viability.

Further evidence of good pollen production and viability was gained by the observation of high seed set in all populations during the 1996 flowering season. Fruits develop in October and November and the seeds are released explosively during November and December. Sampling of the soil stored seed bank prior to the 1996 seed fall showed that although a large seed bank exists, seed viability was low. Approximately 50% of the seeds had been eaten from the inside by the larvae of an unidentified insect, and most of the remaining seeds lacked viable embryos. These results suggest that the viable seed bank is short lived. Over the next 12 months I will assess the deterioration of the seed bank over time.

In addition to the seed bank investigation, plots are being monitored for seedling recruitment to investigate the time of emergence and seedling survivorship. Added to the seed bank data, seedling emergence and survival data will aid in understanding conditions suitable to increase seedling recruitment into the populations.

My genetic studies and the preliminary genetic studies of Peakall (1994) (see also Peakall & Sydes 1996) show considerable genetic divergence among the four *Z. prostrata* populations, which implies that little or no gene flow is occurring among the headlands. Hence, although the populations occur within 3km of each other, there appears to be very little mixing between them. What does this mean for conservation management?



Artwork by Tanya Wilson

The consequences of mixing populations unintentionally or deliberately through translocation need to be considered carefully. At present, we know little about the potential effects of mixing genetically distinct individuals in natural populations, and surprisingly, considering the significance of these effects for the management of rare plants (e.g. translocation), this is a totally neglected area of research. As a component of my research, various artificial crosses are being performed among plants at different genetic and geographic distances. Evidence in the literature suggests that there can be three outcomes: hybrid vigour (potentially advantageous), outbreeding depression (potentially disadvantageous) or no effect.

Most authors recommend a conservative approach when enhancing a population, suggesting that the source plants come from within the population (e.g. Cropper 1993). While guarding against outbreeding depression, this may be unnecessarily restrictive in many cases and loses the potential advantage of enhancing genetic diversity within the populations. The conservative approach may also be counter productive if the few remaining individuals used as a source have a narrow genetic base as might occur for a clonal species or very small inbred populations. In the worst case, population enhancement or reintroduction which is based unknowingly on a single self-incompatible genetic individual would ultimately be ineffective since such populations would be unable to set seed.

Additional populations of *Zieria prostrata*?

Recently a similar Zieria species has been located on a number of headlands south of Coffs Harbour. This plant also possesses a prostrate habit, grows in similar habitats and appears very similar to *Z. prostrata*. It is currently uncertain if these southern populations are *Z. prostrata*, a headland form of the widespread *Zieria smithii* or a distinct species. The only characters which separate this southern form from *Z. prostrata* are the absence of ridges on the stems and the presence of small warts on the stem.

So where to now?

Since the implementation of the initial 1992 Recovery Plan, important progress has been made in both management and research. In the light of the management achievements and a much improved understanding of the biology and status of the species, a set of new priorities for management and research have emerged.

The draft aims of the 1996 recovery plan review include:

- resolution of the taxonomic uncertainty about *Zieria prostrata* and the new southern form;
- reservation and protection of all populations of *Zieria prostrata* (including the southern populations if they are found to be *Z. prostrata*);
- continued elimination or minimisation of threatening processes (e.g. weeds, vehicles, pedestrians); and
- continued ecological and population dynamic research enabling effective management decisions.

Much can be learnt from the case of *Z. prostrata*. First, local support was critical in achieving land protection, perhaps the most important achievement to date. Other management and research outcomes are the consequence of an integrated effort between the NPWS, local council, the Australian National University, the public and enthusiastic members of the recovery team. It is also apparent that management decisions need to be based on sound scientific research. Perhaps some of the recovery actions for *Z. prostrata* would have been different if we had known more about the biology of the species at the time.

Finally, it is very clear that we must constantly assess and re-assess management and research priorities as circumstances change and new information comes to light. Only then can the most effective conservation outcomes be achieved.

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Peakall, R. 1994, *Genetic analysis of the endangered Zieria prostrata: implications for its conservation*. Report to the National Parks and Wildlife Service of NSW, November 1994.

Peakall, R. & Sydes, M. 1996 'Defining priorities for achieving practical outcomes from the genetic studies of rare plants', in *Back from the brink, refining the threatened species recovery process*. Eds Stephens, S. & Maxwell, S., Surrey Beatty & Sons.

Electronic Addresses

If you or any organisation you know, with an interest in plant conservation and allied matters, has an Internet address, please let the National Office know and we'll print it in a future issue of *Danthonia*.

IUCN Plant Conservation Subcommittee Home Page

This is linked to the IUCN and Species Survival Commission home page, and is at:

http://www.rbgkew.org.uk/ssc/plants.html

Community Biodiversity Network's new BIONET service

To quickly access on-line information on community biodiversity monitoring, biodiversity education, bioregional planning, and other related topics, look at the recently upgraded World Wide Web site at http://www.peg.apc.org/~bdnet. It includes the Australian Biodiversity Bulletin on-line, 'Learning about Biodiversity' and 'Policy, Planning and the Law' sections, and an extensive annotated directory of biodiversity and community related World Wide Web sites. The CBN is also developing a 'Community Guide to Biodiversity Information on the Internet' which will be published in 1997.

The Greening of Bundamba Hill 1991-1996

*Bruce Tinworth,
Society for Growing
Australian Plants, Ipswich*

In the winter of 1991 the Ipswich (Qld) Branch of the Society for Growing Australian Plants (SGAP) secured the use of a parcel of land at the Bremer Institute of TAFE's Bundamba campus. It was a prominent but denuded hill with views of Ipswich and beyond to the scenic rim. This was the culmination of more than 12 months of consultation and negotiation with innumerable authorities.

On Sunday 3rd November 1991 a small and diverse group of people gathered together under a sky grey with the promise of rain after a dry winter. The group grew to over 50, some bringing plants, others tools and materials. They were SGAP members, TAFE horticulture students and volunteers with the same green ideals, and came for the official opening and inaugural planting of the Rare and Threatened Species Botanic Garden. They became part of SGAP Ipswich Branch's coming of age.

The then Queensland Minister for Environment and Heritage, the Honourable Mr Pat Comben, MLA, standing under the shade of a mature *Araucaria bidwillii* (Bunya Pine), officially opened our Garden by planting the first of many trees, a *Pouteria eerwah* (Black Plum), an endangered local species. [Ed. This was previously named *Planchonella eerwah*].

Sharing this hill with the solitary, magnificent Araucaria, which has now gained heritage status (TAFE in the Ipswich District 7-2-5, Ipswich Heritage Study 1992 14-1184-0022), is a remnant stand of *Eucalyptus melanophloia* (Silver Leaved Ironbark), and one of the three remnant stands of *Xanthorrhoea* sp. (Grass Tree) in Ipswich .

The Ipswich City Council (the then Moreton Shire Council), local companies and businesses, environmentally aware individuals and SGAP members made donations of materials and services to enable half of the planting site to be contour ripped to a depth of 500 mm, and over 150 trees to be planted, watered, mulched, fertilised, staked and fitted with tree tubes. Their generosity has ensured that the project had resources for the next planting. These persons are to be commended for their foresight. They are now tangibly a permanent part of the first official Rare and Threatened Species Botanic Garden in Queensland, if not Australia.

So impressed was he with this concept that Mr Pat Comben wanted to "...use Bundamba as a prototype for similar projects in different plant communities throughout Queensland." (From Opening Speech, Channel 9 broadcast, 3 November 1991).

The inaugural planting was of a native permaculture area: a garden for the cultivation and study of edible plants. Most of these were donated by Clay Pave Pty Ltd, Dinmore, an initiative of this local company in recognition of the fact that they are a non-sustainable industry. Subsequent plantings have been on the eastern slope, an open forest and woodland community, and on the southern slope, a depauperate rainforest community.

Down the south-western slope is Boyce's Quarry Environmental Park, a twin-sister project. While the Botanic Garden site was almost totally denuded, Boyce's Quarry has been an unofficial refuse tip since the 1930s. The work on this site is mostly carried out as live work activities for the Institute's horticulture students and has for the most part been funded by the Landcare and Environment Action Program (LEAP). Work to date has included a species survey by Lloyd Bird (there were mostly weeds and garden escapees), extensive clearing of the weeds, building of walking tracks, three bridges, a boardwalk, a barbecue, and a picnic shelter (which doubles as a classroom), and extensive planting of indigenous species.

This site has provided the appropriate niche for the planting of tropical, subtropical and riparian communities, so both projects complement each other to the benefit of our environment, SGAP Ipswich and the Bremer Institute of TAFE Horticulture Department.

To date, the following threatened species have been integrated into the appropriate communities, and are included in the National Endangered Flora Collection (NEFC) of the Australian Network for Plant Conservation (ANPC). [Ed. All are cited in the *Rare Or Threatened Australian Plants* (ROTAP) list (1995) also].

Amorphospermum whitei
Corchorus cunninghamii
Cupaniopsis tomentella
Diospyros mabacea
Diploglottis campbellii
Floydia praealta
Macadamia integrifolia
Macadamia tetraphylla
Notelaea lloydii
Pouteria eerwah (previously *Planchonella eerwah)*
Syzygium hodgkinsoniae
Syzygium moorei
Syzygium paniculatum
Syzygium velorum

Many other species planted are listed as Rare or Threatened Plants by the Queensland Department of Primary Industries, or are listed as uncommon on flora surveys conducted by SGAP Ipswich. A large percentage of the remainder are commercially unavailable indigenous species. 166 species from 118 genera have been planted to date.

Rare and Threatened Species
Botanic Gardens
S.G.A.P. Ipswich Branch - T.A.F.E.
Environmental Project

Wendy Protheroe, Director Bremer Institute of TAFE and Bruce Tinworth, SGAP (Ipswich) Project Coordinator. Photograph courtesy of the *Ipswich Advertiser*.

Watering

1992 was a good year with 957 mm (40") of rain, approximately 110% of the south east Qld average rainfall, but it was still necessary to supplement the rain with monthly waterings due to the exposed nature of the site. Our losses from exposure (wind, frost and dehydration) and vandalism were a surprising 1.5% of total plantings.

The subsequent four years have been very hard on our Botanic Garden and our small team of volunteers.

In 1993 only 430 mm (19") of rain fell, 54% of the average, the lowest level recorded since 1936. It is almost amusing in retrospect to think that we postponed our original planting in 1991 because of what we perceived to be a long dry spell. That year was actually just under average at 815 mm (32"). The rainfall in 1995 was even less, and a couple of -10 degree C frosts took their toll.

During one week of 43 degrees C temperatures, community volunteers spent three days minimising the effects of the extremely high temperatures. On a fourth day that week, our young trees were tended by a group of young Danes and Brits from the Australian Trust for Conservation Volunteers (ATCV). They had spent the previous couple of days planting a salt pan at Black Snake Creek, so our hill was almost a respite for them.

In an attempt to reduce the time-consuming hand watering, some irrigation trials were undertaken. The results were predictable, considering our limited water supply: 6 litres per minute at 450 kpa covering all plants in eleven hours with an impact irrigator resulted in a 50 mm penetration. Eight hours with 1.5 minutes of water applied by hand to each individual tree provided 250 mm of penetration. Both measurements were taken immediately after application. So during the summer months (3/4 of the year) it has been necessary to hand water eight hours per week to supplement the needs of each plant. Due to the exposed nature of the site, any longer between watering resulted in noticeable wilt in many species.

Soils

Some tests and trials were also performed to check soil type and soil nutrient. The soil sampling indicates that our site is predominantly loamy clay. Topsoil and organic material are negligible. This is due in part to the activities of the previous owners (saw milling and quarrying), but mostly to 'landscaping' by the present owners who covered a considerable area with varying thicknesses of subsoil spoil removed from an adjacent site during building construction work.

Soil nutrient tests at a cross section of sites were a disappointing bag to say the least. Several granular fertilisers have been trialed with promising results. However, due to the absence of regular penetrating rain, side dressings of granular fertiliser are a wasteful and therefore expensive exercise. To remedy this, technical grade soluble fertilisers and a fertigator have been purchased, making much more of the applied nutrient available to the plants.

Pests

Less than ideal environmental conditions are causing some species to survive in a stressed state, and this creates susceptibility to pest infestations. Most of these have been identified, but the results of our management strategies have been disappointing. Our worst infestations, affecting *Syzygium, Eugenia, Acmena, Waterhousia* and *Pouteria* species is *Ceroplastes rubens* (Pink Wax Scale) and the resultant sooty mould. The other pests include: *Eriococcus coriaceus* (Gumtree Scale) on *Eucalyptus* spp; *Cryptes baccatus* (Wattle Tick Scale) on *Acacia bakeri; Xylorycta leuteotactella* (Twig Girdler) and *Acrocercops chionosema* (Leaf Miner) on *Macadamia* spp; *Ancita marginicollis* (Wattle Ringbarking Beetle) on *Alphitonia* spp; *Philiris innotata innotata* (the caterpillar of the Common Moonbeam Butterfly) on *Ficus coronata;* miscellaneous tip borers on *Podocarpus elatus* and *Pleiogynium timorense.*

Any proven pest management strategies for the above would be appreciated.

It has not been an easy five years, but there have been rewards. The then Australian Nature Conservation Agency (ANCA) recognised our efforts and supported us with two National Landcare Program (NLP) grants totalling $4,200. The Ipswich Beautification Council awarded the Botanic Garden the First Prize in the "Best Use of the Environment" category, and Ipswich Envirocare Inc. awarded the Tinworth family the 1995 Envirocare Environment Award for "...an outstanding achievement in the establishment of the 'Rare and Threatened Species Botanic Garden' at the Bremer Institute of TAFE." Then in 1996 the Ipswich Region Garden Competition gave the Garden awards in two categories: Second Prize for "Community Garden" and an Honourable Mention in the "Native Garden" section.

The greatest reward, though, has been the pleasure of watching a denuded hill transformed into a forest.

Conference

Demonstrating Excellence

October 13-17, 1997: At the Adelaide Festival Centre, Adelaide, SA. Minerals Council of Australia's 22nd Environmental Workshop. Call for papers. Abstracts by 7 March 1997.

Contact: Moya Vanags-Lang.
Phone: 06 279 3634;
Fax: 06 279 3699.

Course

International Diploma in Botanic Garden Education

October 1997: Hobart, Tasmania.

Run by the Royal Tasmanian Botanical Gardens, Botanic Gardens Conservation International and the Royal Botanic Gardens, Kew.

Contact: Andrew Smith, Royal Tasmanian Botanical Gardens, Queens Domain, Hobart, Tasmania 7000.
Phone: 03 6234 6299;
Fax: 03 6234 7719.

Ex Situ Conservation of Australian Alpine Plants

Roger Good, Senior Scientific Officer/Botanist, NSW National Parks & Wildlife Service

There is great interest in southern alpine plants from northern hemisphere alpine plant ecologists, biogeographers and many horticulturists and amateur gardeners. Yet little interest has been shown in Australia for the propagation and use of our native alpine plants in gardens and landscaping projects.

This probably reflects both a lack of appreciation of them as garden plants, and a perception that their use is limited to cold areas. Many in fact have quite wide climatic tolerances and could or should find their way into gardens.

Several factors attract alpine flora enthusiasts.

1. Many Australian alpine species have pink, mauve, blue, yellow or orange flowers in comparison with the predominantly white to cream colours of plants in other alpine areas. This range is seldom seen in any flora covering such a small and discrete floristic zone.

The most colourful genera occur mainly in the tall herbfield of the alpine zone and include *Ranunculus, Gentiana, Astelia, Celmisia, Podolepis, Ewartia, Microseris, Senecio, Neopaxia, Craspedia, Wahlenbergia, Helichrysum, Brachycome* and *Rhodanthe* spp.

2. Many exhibit interesting and unique growth forms and structures.

3. There are low absolute minimum temperatures in the Alps: about minus 21 degrees C compared with minus 15 degrees C for the New Zealand Southern Alps and the Drakenburgs of South Africa.

4. Endemism is high (about 11-12%) with some 10% of species considered to be naturally rare.

5. The reasons for this rarity are also of interest. Several species remain listed as rare and threatened following the many years of alpine grazing, but all are now regenerating over much of their pre-grazing range.

Much has been learnt from these fanciers and gardeners about propagation and cultivation, but much has still to be researched on growth media, mulching and fertilisers appropriate to large scale propagation of commercial quantities of plants.

Ex situ propagation of alpine zone plants

The ex situ propagation of a number of alpine plant species was undertaken by the Soil Conservation Service in the early 1960s. This was a response to the need for native plant material for use in soil erosion control and revegetation programs following the removal of grazing from the alpine zone. Many plant species and communities impacted by grazing did not at that time respond to the removal of grazing pressure, or to attempts to initiate native plant recolonisation through the physical stabilisation of the soils by sowings of exotic grasses and heavy mulching of sown areas.

As the revegetation program was in a national park, this necessitated the use of native species in the program where and when possible. Trial vegetative propagation and trial sowings of some 70 herbaceous species including several grasses and herbs were undertaken, both in the field and under controlled environment glasshouse conditions. Several Asteraceae, and *some Poa* species, were readily grown from seed, although seed viability was low in the grasses and, in several summers, low in the Asteraceae due to fungal attack on the flowers. Very low seed viability of *Chionocloa frigida* occurred in all harvests, which poses interesting questions as to what conditions have provided for the recovery of the species from its near extinction. In the early 1960s *Chionocloa frigida, Aciphylla glacialis* and *Ranunculus anemoneus* were found only in refuge sites, but today are quite common and widespread in the alpine zone.

For soil conservation purposes only a few species were found to be readily propagated in the numbers required for the program each year. These included *Celmisia* spp, *Ewartia nubigena, Leucochrysum albicans, Craspedia* spp, *Leptorhynchos squamatus* and *Neopaxia australasica*, which eventually became the most commonly propagated species. They could all be vegetatively propagated and approximately half a million plants were grown each year.

This program was extended in the 1970s and 1980s to many alpine and sub-alpine shrubs including *Grevillea australis, Orites lancifolia, Tasmannia xerophila, Prostanthera cuneata, Phebalium ovatifolium,* *Oxylobium alpestre, Olearia phlogopappa, Kunzea muelleri* and *Podocarpus lawrencei.*

The selection of these shrub species was based on many years of field observations of the range of conditions in which they occurred naturally. This selection, while subjective, was followed as it was recognised that even when species indigenous to an area are used for soil stability on construction sites, for reconstructing natural communities, or simply for horticultural or aesthetic purposes, most plants will be placed into conditions quite different from those of their usual habitat. The most adaptable species were therefore considered to be the most likely to survive when planted out. It was recognised that some or all of the species might have low propagation success rates, but greater tolerance of environmental conditions when planted out.

General results from the propagation trials

The early trials covered hormone treatment of cuttings, propagation and growing media and watering techniques. The hormone treatments utilised indole acetic acid (IAA), naphthalene acetic acid (NAA) and indole butyric acid (IBA). The potting medium trials used three common potting mixes and three watering systems (misting, once daily watering and constant bottom watering). The results of these trials are summarised as follows:

1. Any increased propagation success rate from the application of hormones to shrub cuttings was very variable, with the greatest benefit accruing from the use of IAA/NAA when used over the range of concentrations from 250 to 1000 ppm. The IBA/NAA treated cuttings were even more variable.

2. Only one species, *Podocarpus lawrencei*, benefitted more from the application of IBA/NAA.

3. The influence of watering technique was not so apparent for the IAA/NAA treatments, but it was evident that continuous misting is quite deleterious, as success rates were almost nil under a mist watering program.

4. A once daily watering of pots with a set amount of water per pot was more effective than bottom watering.

5. Alpine and sub-alpine shrub species which grow naturally in alkaline soils can be propagated and grown on in neutral to acid potting mixes but those which grow naturally in acid soils do not grow on in alkaline potting mix.

6. The most satisfactory potting mixes were those with high water holding capacity. The best results were gained from a 50/50 mixture of perlite and sandy river loam. High pH mixes which incorporated vermiculite, and low pH mixes with a high proportion of commercially available peat, exhibited limited root growth compared with other mixes based on quality river loams. (Any limitations/constraints on root development would be exhibited after planting out as alpine plants have high root to foliage ratios of 5:1 to about 27:1).

7. When considering both propagation success and growth rates (for two years after establishment), *Grevillea australis* was the most successful and easiest shrub species to vegetatively propagate and grow in commercial numbers.

8. Papilionaceous species such as *Bossiaea foliosa, Oxylobium alpestre* and *O. ellipticum* can be propagated from cuttings but subsequent growth rates are exceeded by plants raised from seed.

9. All shrub species exhibited faster growth rates on planting out if grown on for three to four years in pots, as compared with material planted out one to two years after propagation.

Trials on the most appropriate temperature and humidity conditions for the taking of cuttings and harvesting of seed are progressing. Problems with fungal attack on herbaceous seed have been experienced in the past, as a result of collecting seed in conditions of high humidity even when low field temperatures exist.

Additional species are included in current trials, with members of the British Alpine Garden Society participating in trialling a number of species. These include *Luzula, Carex, Oreomyrrhis* and *Plantago* spp, *Aciphylla glacialis* and the interesting, very short flowering *Herpolirion novae-zelandiae.*

Warwick Papst of the Victorian Department of Natural Resources and Environment is also carrying out extensive propagation and field trials of five alpine species for specific revegetation programs in Kosciusko National Park. These include genetic studies of *Poa fawcettiae* in association with staff of La Trobe University and the Royal Botanic Gardens, Melbourne.

Regional Groups

Tasmanian Region

Andrew Smith, Community Education and Training, Royal Tasmanian Botanical Gardens

As a follow up to a visit to Tasmania from ANPC Coordinator Jeanette Mill to discuss the establishment of the regional group here, a new community network has been established.

It was recognised that two important aims of the ANPC are:

- keeping people informed, and
- getting people involved.

The integrated approach to conservation recognises that the "people" who need to be informed and involved includes the general community.

With this in mind, the Royal Tasmanian Botanical Gardens (RTBG) proposed the formation of the Botanical Guardians to ensure that the general community was better informed on all aspects of plant conservation and was provided with opportunities to become involved with the process. The name of the network is adapted from a similar network in Victoria, but has subtle differences in objectives and methods.

The Botanical Guardians is being developed in con-junction with existing community networks, particularly the Understorey Network. The latter is a thriving organisation in Tasmania, promoting the use of understorey plants in Landcare type projects on private property. Members are given information and assistance in collecting and growing these plants. Eventually, cultivation and collection information will be available from a database to be housed at the RTBG. All members of the Understorey Network are automatically members of the Botanical Guardians.

The Botanical Guardians has two components. The first is the production of a plant conservation newsletter. This will once again be in conjunction with the Understorey Network, with regular information being supplied by the RTBG, and with contributions from other organisations as appropriate. The newsletter will ensure that interested people are aware of recovery and education work and so on being conducted in Tasmania.

The second component is a member database, recording the ways in which individual members would like to be involved in plant conservation. A range of options are offered, including field collection, monitoring and surveying replanting sites, and growing and planting endangered species on private land and back into the wild. It is hoped that organisations involved in plant conservation will come to see the Botanical Guardians as a resource of local community assistance when undertaking plant conservation projects.

The Botanical Guardians network is still in its infancy, but since its launch at the Launceston Garden Festival in September 1996 there has been a healthy application for membership. The members of the network have indicated their desire to do their bit for the environment. It is now up to the organisations responsible for plant conservation to include the community in the work which needs to be done. Hopefully this will help to create a local community ownership of plant conservation which will continue well after government funding runs out and botanists have moved on to other projects.

Contact: Andrew Smith.
Phone: 03 6234 6299;
Fax: 03 6234 7719.

Subtropical Region

The next meeting, which was to be held on Saturday 7th December 1996, has now been deferred to a date to be announced.

The topic will be "Research and Recovery Work for the Endangered *Acacia porcata* and *Austromyrtus gonoclada*."

The speakers are Dr Julia Playford (University of Queensland) on genetics in conservation, Sharyn French (Logan City Council) on *Austromyrtus gonoclada* and Andrea Leverington (Qld Department of Environment) on *Acacia porcata*. A field trip will follow.

Contact: Sharyn French.
Phone: 07 3826 5338;
Fax: 07 3805 5372.

South West Slopes Region

Paul Scannell, Albury Botanic Gardens, and
Mark Sheahan, Department of Land & Water Conservation, Wagga Wagga

The interest in the South West Slopes Region is increasing steadily. Many people are picking up a copy of *Danthonia* and contacting us to join the list.

Our last on-site meeting was held on Sunday 22 September at "Yallock", the property of Roger and Margaret Geddes, just north of Holbrook. The day was a joint venture with SGAP, Greening Australia, Holbrook Landcare, Department of Land & Water Conservation (LWC) and the ANPC, and was a great success.

Dick Green from Greening Australia and Mark Sheahan from LWC led an afternoon stroll through 130 acres of isolated, managed bushland and provided interesting discussion on management practices. The area was a real credit to Roger and Margaret. With several displays, great flora and fauna and a magnificent BBQ lunch, it was an excellent opportunity to meet people, swap information and see just how successful good management practices can be.

The Group's work on protecting the single plant of *Caladenia concolor*, the Crimson Spider Orchid (3VCi in ROTAP), found by Peter Branwhite in the Jindera Gap area, is continuing. Several fence repairs, lock and chain replacements, and some Crown Land signage, have improved the situation. Leanne Wheaton and Ian Davidson are conducting a fencing incentive program, on behalf of the Nature Conservation Working Group of the Murray Catchment Management Committee with National Landcare funding, and they may be able to assist with the Crimson Spider Orchid situation.

Our network is growing steadily and we now have a very good communication infrastructure in place, enabling quick and effective action to be taken when problems arise. We are still working on our site registration form and with help from members Fleur Stelling and Stuart McMahon, it will be finalised soon.

Of additional interest is the work being carried out at the Albury Botanic Gardens. Our native section planting has begun, concentrating on endemic South West Slopes species, and along with Sue Brunskill, we are chasing up funding to establish a seed bank in the Albury Botanic Gardens. Any ideas on avenues to funding, for a three-year part time position to establish the seed bank, would be greatly appreciated. Mark Sheahan has provided cuttings of *Grevillea alpina* Keajura form, with a deep burgundy flower, for propagation, and hopefully we can establish some in the native section.

The Gardens are holding a public meeting on Sunday 8 December at 2pm to establish a Friends Group. On the agenda will be the plans for a meeting room to enable local Landcare groups to use it as a centralised information exchange area and utilise some of the nursery facilities and office equipment. We are hoping the Friends will be able to help with collection, cleaning and recording for the seed bank.

Next Meeting

At the moment there is no date set for another meeting.

Contact: Paul Scannell.
Phone: 060 238 241.

Victorian Region

The Victorian group's seminar at Melbourne Zoo has been deferred, and the new date is to be advised.

The main topic is to be "Corridors and Plants". This will cover the role of corridors in plant conservation and the role of plants in corridor design, with case studies and talks on topics including weeds, reintroduction and geneflow.

Contact: Dale Tonkinson, Greening Australia.
Phone: 03 9457 3687;
Fax: 03 9457 3687.

SE NSW and ACT Region

Report of the meeting held on 19 October 1996

Ros Cornish, local landholder

Approximately 20 people, including some from the Sydney Region, attended the meeting held at the Australian National Botanic Garden.

Dr Rod Peakall gave a talk on his work on integrating ecological and molecular tools to address evolutionary questions. Rod is Lecturer in Conservation Biology, Plant Reproduction and Ecological Genetics, Division of Botany and Zoology, Australian National University.

The title of the talk was "Defining research priorities for achieving practical conservation outcomes: Lessons from the cases of *Haloragodendron lucasii*, *Zieria prostrata* and *Wollemia nobilis*." Rod described his and his students' work to assess the clonality of these rare plants as an aid to designing conservation strategies for them.

The objectives of the genetic and ecological study of *H. lucasii* ('Hal') are to determine the extent of clonality within the natural populations and to identify factors limiting sexual reproduction. Initially the population at one site was estimated at two hundred plants but further research showed that these are suckers of two individuals. The article 'The Romance of *Haloragodendron lucasii* Orch. (2ECi)', *Danthonia* Vol. 5 No. 1, June 1996 gives more detail on this and the successful rediscovery effort. Other findings indicate that there is extensive clonality and the flowers are male sterile. There are now known to be four sites with over 1000 clumps of plants but only eight genetic individuals.

The lessons from this are:

- more effective surveying is a priority for rare plants;
- census size may overestimate the true number of genetic individuals capable of reproduction, so genetic research may be a priority; and
- integrated conservation programs involving cooperation between conservation agencies, local councils, academic institutions, community groups and the public can achieve effective conservation outcomes.

Rod was asked to investigate the Wollemi pine - *Wollemia nobilis* - to examine the extent of clonality in the population. The practical implications of such a genetic study are:

- determination of the necessity for an effective ex situ collection and, if needed, design;
- artificial generation of genetic diversity to enhance the population;
- active management to enhance seed set;
- bar-coding using genetic fingerprinting to discourage illegal collection and trade; and
- evaluation of important ecological parameters.

So far there appears to be low genetic diversity which may mean extensive clonality. The article 'Conserving The Wollemi Pine: An Integrated Approach' in *Danthonia*, Vol. 5, No. 2, September 1996, provides further information.

Z. prostrata is only known from four headlands north of Coffs Harbour. Following its recognition as a distinct species in 1990, a Recovery Plan was drawn up and a genetic study was begun. It was found that all the populations (over 1,000 individuals) are genetically distinct so there is a need to preserve them all. There is extensive seed set, many seedlings and a good seed bank. Similar taxa have been found further south. [Ed. See the article by Tricia Hogbin, one of Rod's students, on page 7 of this issue].

Rod invited views on what the future research and management priorities should be and there was a close match with the planned actions for 1997:

- minimise impact of weeds;
- eliminate vehicular and pedestrian traffic;
- increase community awareness;
- clarify taxonomy and identify the full distribution;
- carry out biological research to enable informed management; and
- evaluate the need for population enhancement and options for protection against catastrophe.

Rod concluded by listing the priorities which he believes his work has pointed to:

- more comprehensive surveys for rare plants;
- clarification of uncertain taxonomic status, which means that complementary genetic research may be necessary;
- more critical evaluation of the need for population enhancement and the most effective methods by which this can be achieved: translocation may not be necessary.

In addition, the attendees agreed that it is essential for scientists to talk to managers and that the public needs to be involved in recovery/conservation work.

At the meeting following Rod's talk, there was a discussion about next year's program. A number of ideas were discussed and the group decided that a sub-committee will meet in December to go into the program in more detail.

Next Meeting

The next meeting will be held at 2 pm, 14 December, at the Theatrette of the Australian National Botanic Gardens. The topic will be a revisitation of the ACT, NSW and Commonwealth legislation affecting the conservation of flora.

Group Coordinator: John Wilkes.

Phone: 06 238 2490.

Email: widgiewa@msn.com

Sydney Region

Report of the Meeting held on 16 November 1996

Ben Correy, Technical Officer, NSW National Parks & Wildlife Service

About 40 people attended the meeting held at the NSW National Parks & Wildlife Service (NPWS) Heritage Centre at Blackheath. After a delicious morning tea provided by the Blue Mountains Rare and Endangered Species Group, participants enjoyed a series of short talks.

Management of Blue Mountains plant communities

Wyn Jones (Senior Naturalist, NPWS) provided a picture of these issues, with emphasis on the 'hands on' approach involving the local community and relevant agencies. An example was the successful weeding program to release some Dwarf Mountain Pines (*Microstrobos fitzgeraldii*), growing in the spray zone of some waterfalls, from the clutches of the dreaded English Ivy (*Hedera helix*). A truly cooperative effort involved agencies (NPWS, Police Rescue, Blue Mountains City Council), local businesses (Australian School of Mountaineering), professional bush regenerators and local volunteers (Blue Mountains Rare and Endangered Species Group, Landcare/Bushcare group members). The logistics of the operation involving the use of single rope techniques were outlined. It was hoped that this program would be an annual event and the project could be used as a blueprint for the control of exotic species growing in an increasing number of Blue Mountains locations which are difficult to access.

Great Grose Gorse Walk III

Cath Ireland (Ranger, NPWS), outlined the Service's strategies for controlling the noxious weeds spreading into the Grose Valley. They threaten riparian vegetation including *Epacris sparsa* (2VCi) which grows only in the creeklines. Major infestations have been mapped and some weeds removed. Cath acknowledged the efforts of all the community volunteers who have helped.

Acacia gordonii

Steve Douglas (consultant ecologist and environmental planner) talked about the proposed new status of this plant as a Schedule 2 Vulnerable Species under the *Threatened Species Conservation Act 1995*. In August, volunteers carried out a survey while *Acacia gordonii* was flowering. Several disjunct populations have been found (about 910 plants). The current ROTAP code is 2K (Briggs & Leigh 1996), but it is felt that this should be revised to 2VCi, geographic range less than 100km, vulnerable, population reserved, but inadequately.

Blue Mountains Bioindicators Project

Lyndsay Holme (NPWS) spoke about one aim of the project: to make a quantitative assessment of how far and to what extent the impacts of urbanisation processes extend into the areas of surrounding bushland. The data collection will rely on community participation and will be facilitated by a volunteer coordinator.

WildPlant Rescue Service

Mikla Lewis outlined the group's achievements. (For more information, see *Danthonia* 5 (1), page 2).

Maria Matthes and Ben Correy (NPWS) also talked about Species Recovery Plans for *Epacris hamiltonii* and *Eucalyptus copulans*.

Field trip

After a lunch provided by members of WildPlant Rescue, people visited rare plant management sites, including those of *Isopogon fletcheri* (2V) and *Acacia meiantha* (2RCi).

Thanks to all the speakers and caterers, and the NPWS Blue Mountains District for the venue.

Next Meeting

This will be held in February 1997 in Sutherland.

Contact: Tracey Armstrong, Group Coordinator.

Phone: 046 46 2477;

Fax: 046 46 2465.

Email: tracey@rbgsyd.gov.au

The Australian Network For Plant Conservation
Membership List

The date (1995/6/7) indicates that the member has joined or renewed for that year. Addresses and names of contact persons are available from the National Office.

Corporate Members

Adelaide Botanic Gardens (1997)
Albury Botanic Gardens, NSW (1997)
Alcoa of Australia Ltd, WA (1996)
Australian Army (1995)
Australian National Botanic Gardens (1996)
Aust Tree Seed Centre, CSIRO (1996)
Barcaldine Shire Council, Qld (1996)
Biodiversity Group, Environment Australia (1996)
Bremer Inst. of TAFE, Qld (1996)
Centre for Plant Biodiversity Rsch, ACT (1996)
City of Frankston, Vic (1995)
Coffs Harbour City Council, NSW (1997)
Conservation & Land Management, WA (1995)
CSIRO Publishing (1996)
Eurobodalla Bot Garden, NSW (1996)
Flecker Botanic Gardens, Qld (1997)
Forestry Tasmania (1996)
George Caley Botanic Garden, NSW (1995)
Gladstone Tondoon Botanic Garden, Qld (1997)
Kings Park and Botanic Gardens, WA (1996)
LWRRDC, ACT (1996)
Logan City Council, Qld (1997)
Minerals Council of Aust, ACT (1997)
Mt Coot-tha Botanic Gardens, Qld (1996)
Nature Conservation Services, ACT (1997)
Norfolk Island Botanic Garden (1996)
North Forest Products, Tas (1997)
NSW National Parks & Wildlife Service (1996)
Parks and Wildlife Commission, NT (1997)
Parks Wildlife and Heritage, Tas (1997)
Queensland Herbarium (1997)
Randwick City Council, NSW (1997)
RGC Mineral Sands, WA (1996)
Royal Botanic Gardens, Melbourne (1996)
Royal Botanic Gardens, Sydney (1997)
Royal Tasmanian Botanical Gardens (1997)
Standing Committee on Forestry, ACT (1995)
Stony Range Flora Reserve, NSW (1995)
Townsville City Council (1997)
Transgrid Sydney, NSW (1996)
Transgrid Yass, NSW (1996)
Wollongong Botanic Gardens (1997)
Zoological Parks Board of NSW (1996)
Zoological Board of Victoria (1996)

International Associates

Botanic Gardens Conservation Intl, UK
Botanical Research Institute of Texas
Canadian Botanical Conservation Network
Center for Plant Conservation, USA
David Given, NZ
Honiara Botanic Gardens, Solomon Islands
Indian Society for Conservation Biology
Indonesian Network for Plant Conservation
Clive Jermy, UK
Kebun Raya Indonesia
Noelline Kroon, South Africa
Missouri Bot. Gardens Library (1996)
National Botanical Institute, South Africa
PlantNet, UK
Rare Plant Consortium, Canada
Royal Botanic Gardens, Kew, UK (1996)
Society for Ecological Restoration, USA
Dr I Wayan Sumantera
Suva Botanical Gardens, Fiji
Roy Taylor, USA (1996)
Vailima Botanic Gardens, Western Samoa
Wellington Plant Conservation Network

Other Organisations

Assn. of Soc. for Growing Aust Plants (1996)
Australian Arid Land Botanic Garden, SA (1996)
Aust Assn. of Bush Regenerators (1996)
Aust. Trust for Conservation Volunteers (1995)
Brunswick Valley Heritage Park, NSW (1996)
Burrendong Arboretum Trust, NSW (1996)
Community Biodiversity Network (1996)
Cotter Parkcare Group, ACT (1996)
Deakin Uni, Rusden Campus Library, Vic (1995)
Friends of Grasslands, ACT (1997)
Friends of North Coast Regional BG, NSW (1996)
Greening Australia (ACT/SENSW) (1997)
Greening Australia (NSW) (1996)
Greening Aust (NSW) Education (1995)
Greening Australia (Vic) (1996)
Greening Western Australia (1996)
Hunter Region Botanic Gardens, NSW (1996)
Illawarra Zoological Society, NSW (1995)
Indigenous Flora & Fauna Assn (1996)
Lismore Rainforest Bot. Garden (1997)
Macksville High School (1995)
Myall Park Botanic Garden, Qld (1996)
National Threatened Species Network (1996)
Network of Reg Bot. Gdns, Qld (1996)
Olive Pink Botanic Garden, NT (1997)
Pangarinda Arboretum, SA (1996)
Royal Aust Institute of Parks & Recreation (1995)
Royal Geographical Society of Qld (1997)
Royal Zoological Society of SA (1996)
SGAP Blue Mtns Group, NSW (1996)
SGAP - Canberra Region Inc (1997)
SGAP - Dryandra Study Group (1997)
SGAP - East Hills Group, NSW (1995)
SGAP - Far Nth Coast Gp, NSW (1997)
SGAP - Grampians Group, Vic (1995)
SGAP - Hobart District Group (1996)
SGAP - Ipswich Branch, Qld (1996)
SGAP - Maroondah Inc, Vic (1996)
SGAP - New South Wales Ltd.(1996)
SGAP - Newcastle, NSW (1997)
SGAP - North Shore, NSW (1997)
SGAP - Northern Group, Tas (1996)
SGAP - North West, Tas (1997)
SGAP - Queensland Region (1997)
SGAP - Southside, Qld (1995)
SGAP - South West Slopes, NSW (1996)
SGAP - Tasmania Region (1996)
Sunraysia Oasis Botanic Gardens (1996)
Tasmanian Arboretum Inc (1997)
Trust for Nature (Victoria) (1996)
Understorey Network, Tasmania (1996)
Wallum Action Group, Qld (1996)
Wildflower Society of WA (1996)
Wildflower Soc. of WA - Mandurah (1995)
Wildflower Society of WA, Nth Suburbs (1996)
World Wide Fund for Nature Australia (1997)

Individual Members

Dr David Aldous, Vic (1996)
Jan Allen, NSW (1997)
Ian Anderson, ACT (1997)
Margaret Bailey, NSW (1996)
Greg Bain, Vic (1996)

Bee & Bill Barker, Vic (1996)
Clive Barker, NSW (1996)
Tim Barlow, Vic (1996)
Robert Barnes, NSW (1996)
Peter Barrer, ACT (1996)
Stephen Barry, Qld (1996)
Brett Beecham, Vic (1996)
Stephen Bell, NSW (1996)
John Benson, NSW (1997)
Megan Birmingham, NSW (1996)
Robert Blackall, NSW (1996)
Dhyan Blore, NSW (1995)
Dr Robert Boden, ACT (1996)
Elizabeth Boesel, NSW (1996)
Dr Barbara Briggs, NSW (1997)
Dr AHD Brown, ACT (1997)
Douglas Brown, Tas (1997)
Louise Bull, NSW (1996)
Richard Burns, Tas (1997)
Dr G Burrows, NSW (1996)
Geoff Butler, NSW Hon. Life Member
Geoff Carr,Vic (1997)
Mary Cawte, NSW (1996)
Calder Chaffey, NSW (1996)
Irene Champion, Qld (1996)
John Clark, ACT (1995)
Anne Coates, WA (1996)
Fiona Coates, Vic (1996)
Anne Cochrane, WA (1997)
Ian Cole, NSW (1996)
Jon Cole, NSW (1996)
Ben Correy, NSW (1996)
Russell and Sharon Costin (1996)
Jennifer Cowie, NSW (1997)
Ian Cox, NSW (1996)
Isobel Crawford, ACT (1996)
Simon Cropper, Vic (1997)
Louise Cusack, NSW (1996)
Paul Davies, NSW (1997)
Richard Davies , SA (1996)
John Delpratt, Vic (1996)
Egon Demuth, NSW (1997)
Susan Denham, NSW (1995)
Ross Doig, NSW (1997)
Stuart Donaldson, ACT (1996)
Wendy Dossetor, ACT (1996)
Geoffrey T Edwards, Qld (1997)
Alison Elvin, ACT (1996)
Elizabeth Fenton, Vic (1996)
Paul Field, Vic (1996)
Lance FitzGerald, NSW (1997)
Paul Foreman, Vic (1997)
Julie Foster, ACT (1996)
Bill Gale, NSW (1996)
Elizabeth George, WA (1996)
Lill Gillan, Vic (1996)
Kaye Glennan, WA (1996)
Roger Good, ACT (1996)
Dave Gordon, Qld (1996)
Dr Janet Gorst, Qld (1997)
Robert Gourlay, ACT (1996)
William Grattan, NSW (1997)
Matthew Gray, NSW (1995)
Joanne Green, NSW (1995)
Helen Grey-Smith, NSW (1995)
Sandra Griffith, Qld (1996)
Barrie Hadlow, ACT (1996)
Roger Hart, Christmas Is. (1996)
Tim Hayes, NSW (1996)
John R Hayter, Qld (1995)
Els Hayward, Tas (1997)
Michael Healey, NSW (1996)
Jill Hickie, Tas (1995)
Garth Hockly, Qld (1997)
Mrs S Hyne, NSW (1996)
Greg Jackson, NSW (1996)
Amanda Johnson, NSW (1996)
Kerry Jones, Vic (1996)
Alison Kelly, NSW (1995)
Van Klaphake, NSW (1997)
Heather Knowles, Qld (1996)
Patty Kolln, NSW (1996)
Jill Landsberg, ACT (1997)
Gordon Limburg, NSW (1997)
John Litchfield, ACT (1996)
Vicki Long, WA (1996)
Bill McDonald, Qld (1996)
Tien McDonald, NSW (1996)
Alex Mackenzie, NSW (1996)
R D Maher, Qld (1995)
David Mason, NSW (1996)
Maria Matthes, NSW (1996)
Stephen Mattingley, ACT (1995)
Lyn Meredith, ACT, Hon. Life Member
Tammy Mills-Thom, NSW (1997)
Geoffrey Mitchell, NSW (1996)
Judith Moffatt, Qld (1995)
Brian Mole, Vic (1996)
Lorna Murray, Qld (1996)
Sharon Nash, NSW (1997)
Robyn Newman, NSW (1995)
Nan Nicholson, NSW (1997)
Alexander Nicol, NSW (1995)
Henry Nix, ACT (1996)
Ivana Noell, Qld (1995)
Brett O'Donovan, NSW (1996)
Jacqui O'Grady, Qld (1995)
Peter Olde, NSW (1996)
Joan Overeem, NSW (1996)
Matthew Oxford, SA (1995)
Dr. Bob Parsons, Vic (1997)
Hugh Paterson & Francoise Matter, NSW (1997)
J Playford, Qld (1997)
Tim Powe, ACT (1996)
Brian Quinn, Vic (1996)
Frances Quinn, NSW (1996)
Murray Ralph, Vic (1995)
Peter Ray, WA (1996)
Ruth Readford, NSW (1996)
Phil Redpath, NSW (1996)
Dorothy Redreau, WA (1996)
Bonni Reichelt, Qld (1996)
Mark Richardson, NT Hon. Life Member
Brett Robinson, Qld (1996)
Mark Robinson, NSW (1997)
Esma Salkin, Vic (1996)
Alison Shapcott, NT (1996)
Sarah Sharp, ACT (1996)
Mark Sheahan, NSW (1996)
Howard Smith, NSW (1995)
Marilyn Smith, NSW (1996)
John Smyth, NSW (1997)
Diana Snape, Vic (1997)
Fiona Spiers-Ashcroft, ACT (1996)
Marilyn Sprague, Vic (1997)
John & Irene Story, Qld (1997)
Joe Swartz, NSW (1996)
Jane Tarran, NSW (1996)
Nicki Taws, ACT (1996)
Technical Librarian, Qld (1995)
Craig Thompson, NSW (1996)
Lyn Thompson NSW (1995)
Jan Tilden, Qld (1995)
Vivienne Turner, Vic (1995)
Bindi Vanzella, NSW (1996)
John Virtue, SA (1995)
Dierk von Behrens, ACT (1997)
Sue & Warner Wait, Tas (1996)
Josephine Walker, NSW (1996)
Bruce Wannan, Qld (1996)
Chris Ward, NSW (1995)
Sylvia Webber, NSW (1997)
Matt White, Vic (1996)
John Wilkes/Ros Cornish, NSW (1996)
Jann Williams, ACT (1997)
Mark Williams, NSW (1995)
ME Williams, Qld (1995)
J & A Willinck, NSW (1996)
Anne-Marie Wilson, ACT (1996)
Brigitta Wimmer, NSW (1996)
John Wrigley, NSW (1996)
Martin Zierholtz, NSW (1997)

Donations Received from:

John Benson (1996)
Julie Foster (1996)
EA George (1996)
Gary Leonard (1996)
Gordon Limburg (1996)
Plantique (1996)
Martin Zierholtz (1997)